Fish Kill Assessments
Texas Parks and Wildlife
Kills and Spills Team (KAST)

SWQM Workshop October 14, 2015

Adam Whisenant – Coastal Fisheries

Greg Conley – Inland Fisheries

Purpose

Provide guidance for conducting fish kill assessments during kill and spill investigations

Fish Kill Assessment Overview

1. Welcome to KAST
2. General Guidance
3. Water Body Guidance
4. Counting and Measuring Dead Fish
5. Field Exercise

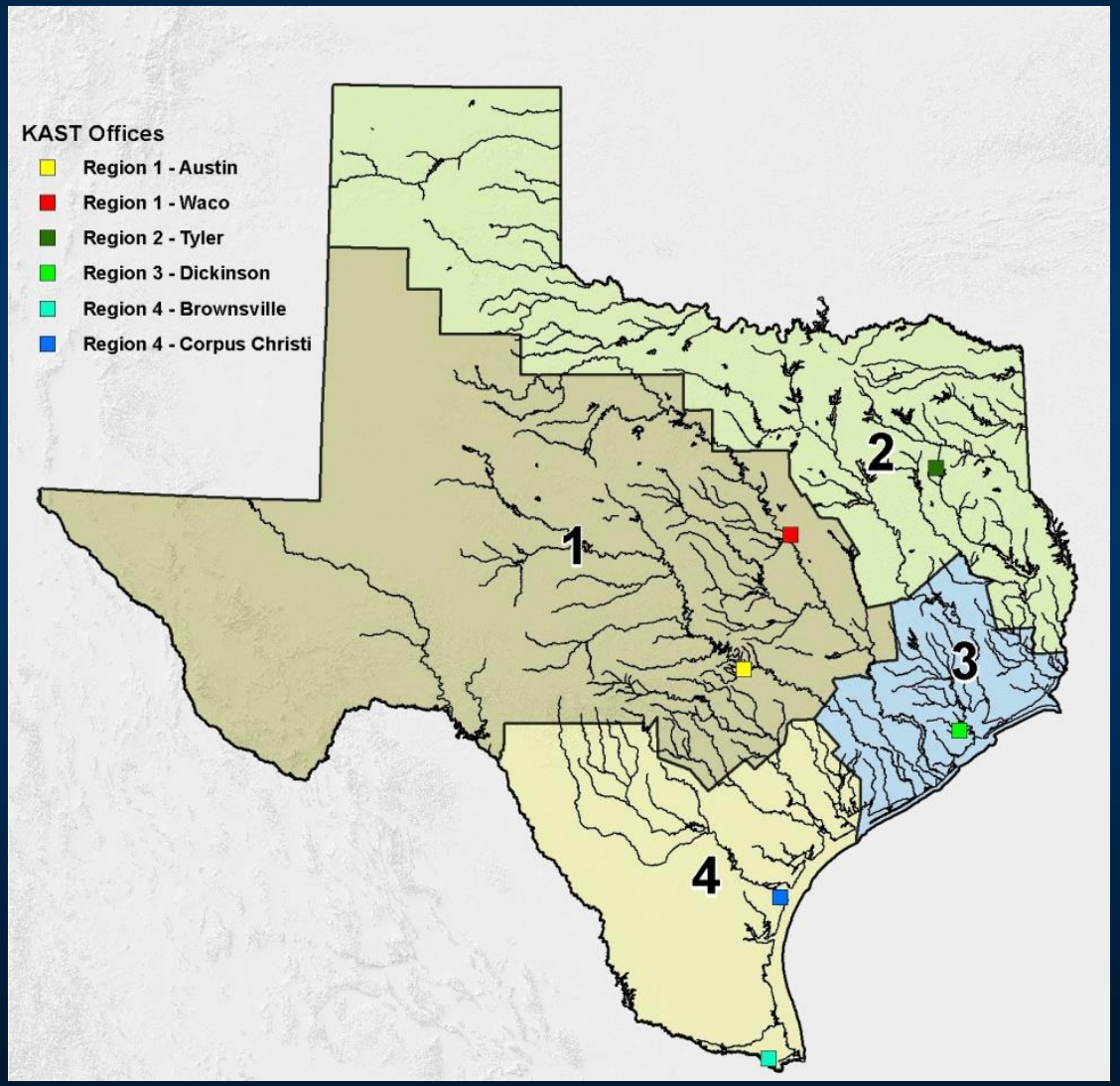
Goal of the Kills and Spills Team (KAST)

- To promote the conservation of natural resources and encourage sustainability in the face of increased population growth and development
- To respond to and document fish and wildlife kills and pollution incidents and minimize environmental damage resulting from these incidents
- To obtain compensation, reparation, and restoration for environmental damage
- To act as a technical resource regarding relationships between water quality, habitat, and living organisms

KAST Boundaries

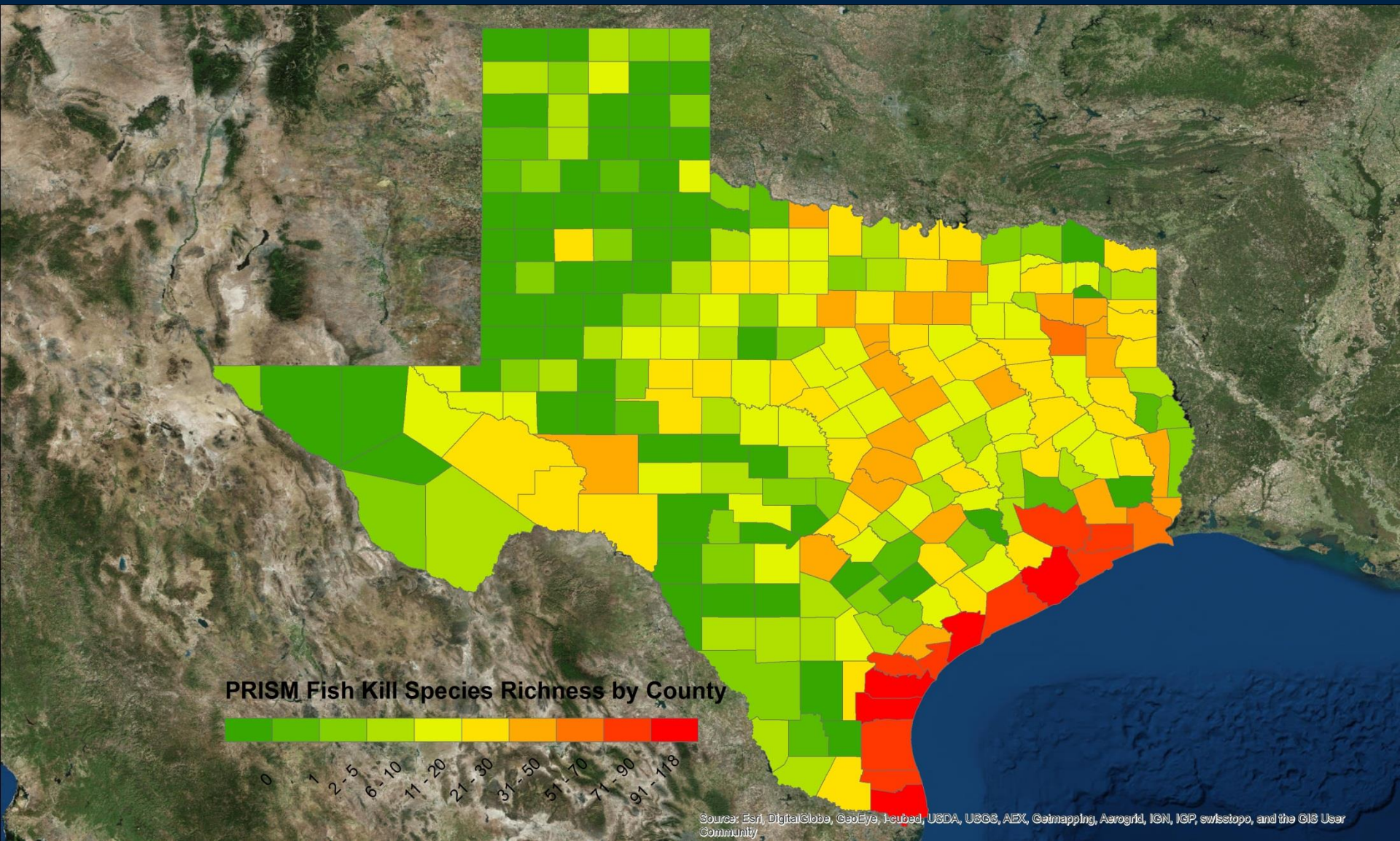
Regional structure based on watershed approach

- **KAST Regional Coordinators**
  - **Travis Tidwell (Region 1)**
  - **Greg Conley (Region 2)**
  - **Steven Mitchell (Region 3)**
  - **Alex Nuñez (Region 4)**



PRISM Database

Pollution Response Inventory Species Mortality



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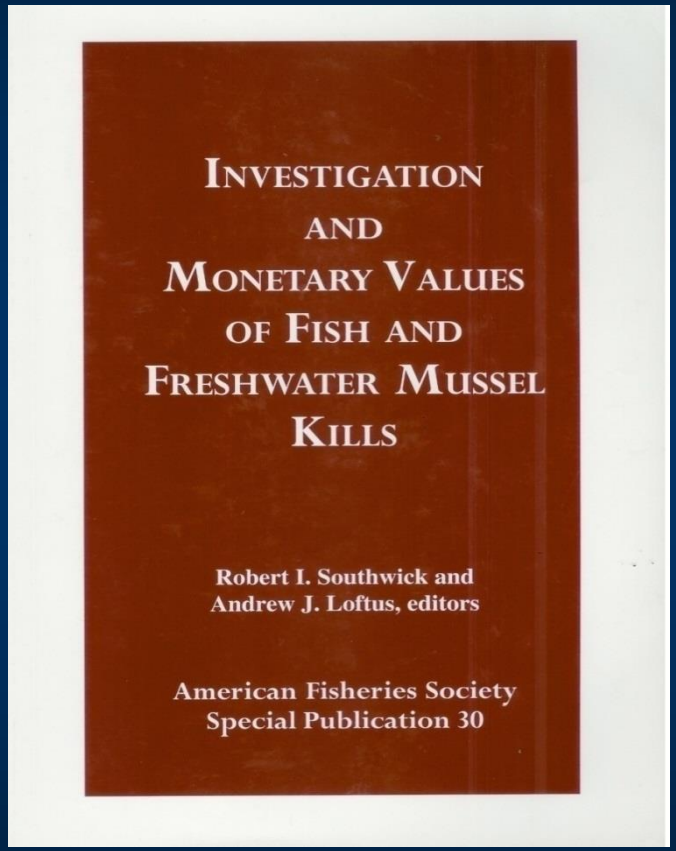
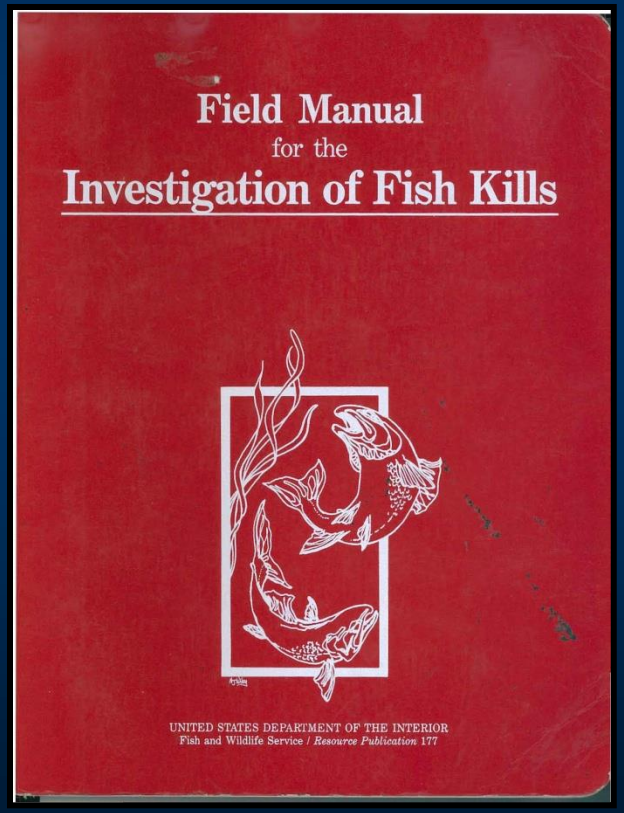
References for Fish Kill Investigations





General Field Investigation Guidance

Once the decision has been made to go onsite you need to determine investigation approach

- Identify access points (boat ramp, road crossing, etc.)
- Evaluate time constraints
- Equipment needs
- Print out map

General Field Investigation Guidance

Other items to consider

- Identify a responsible party if applicable
- Locate start and end point
- Determine size of fish kill
- Develop fish kill count approach (number of counts, distances, and count locations)
- Identify any hazards
  - Consider specifics of event (e.g. material spilled)
  - Weather
  - Water body type

General Guidance

Fish kill counting methods vary

- With site characteristics (access, area covered, time available, etc.)
- With habitat type (river, pond, reservoir, etc.)

Two sampling options available

- Total counts
- Area sampling

General Guidance

Total Counts

Method consists of covering the entire area of impact and recording data for every visible/retrievable dead fish

Used mainly when dealing with a relatively small area of impact

General Guidance

Area sampling

Method involves the collection of data from a subset of the impacted area

- **Determine total area of the kill**
- **Sample segments equidistant apart**
- **Random start**
- **Determine total area/distance surveyed**
- **Expansion Factor = Total Area/Area Surveyed**

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Water Body Guidance

Narrow Streams - streams that an investigator can count or collect every visible dead fish along both banks and within the stream

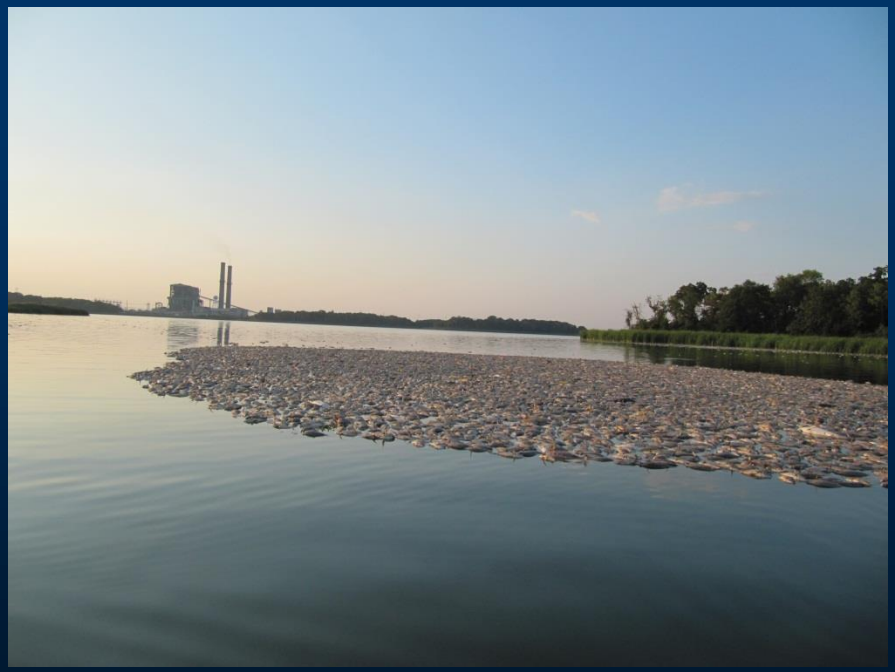
Water Body Guidance

Narrow Streams - Completely Accessible

- A completely accessible stream is one without any obstructions to access of the sampling area
- Sample at least 10% of affected area if possible
- Use systematic sampling with a random start
- Determine length of kill area
- Determine number and location of sample segments
- Typically sample both banks

Water Body Guidance

If a stream is too wide, then use methods for sampling lakes and wide streams



Water Body Guidance

Lakes and Wide Streams - Shoreline

Shoreline sampled in segments

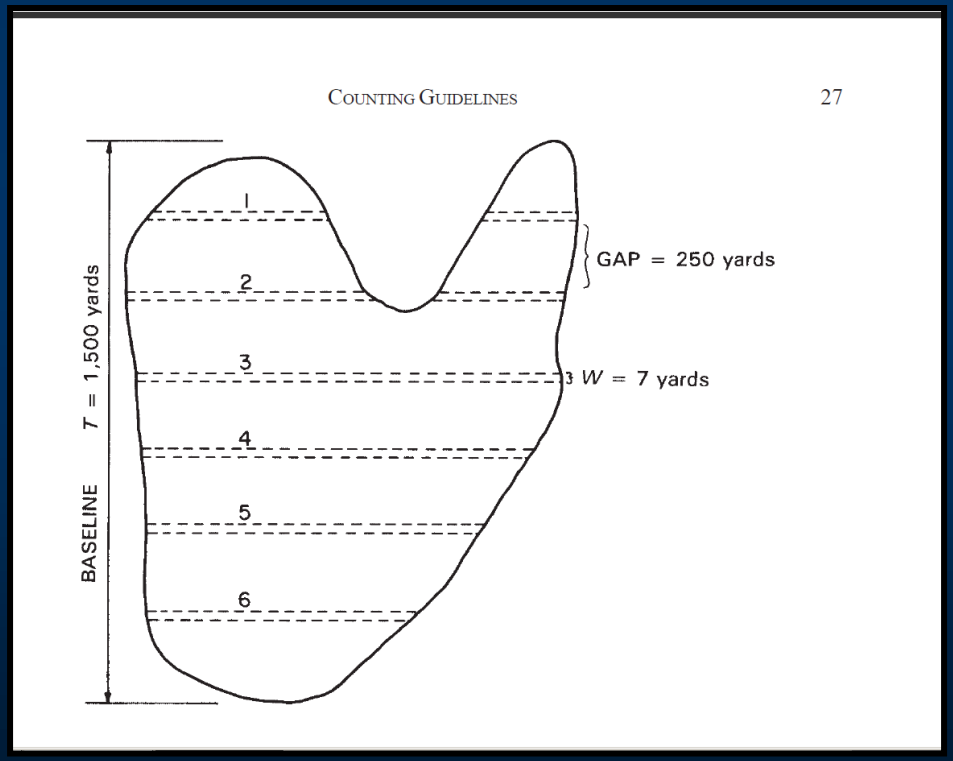
- Similar to narrow stream sampling
- Segment widths uniform
- Random start for segment sampling

Water Body Guidance

Lakes and Wide Streams - Open Water

Open water sampled with transects

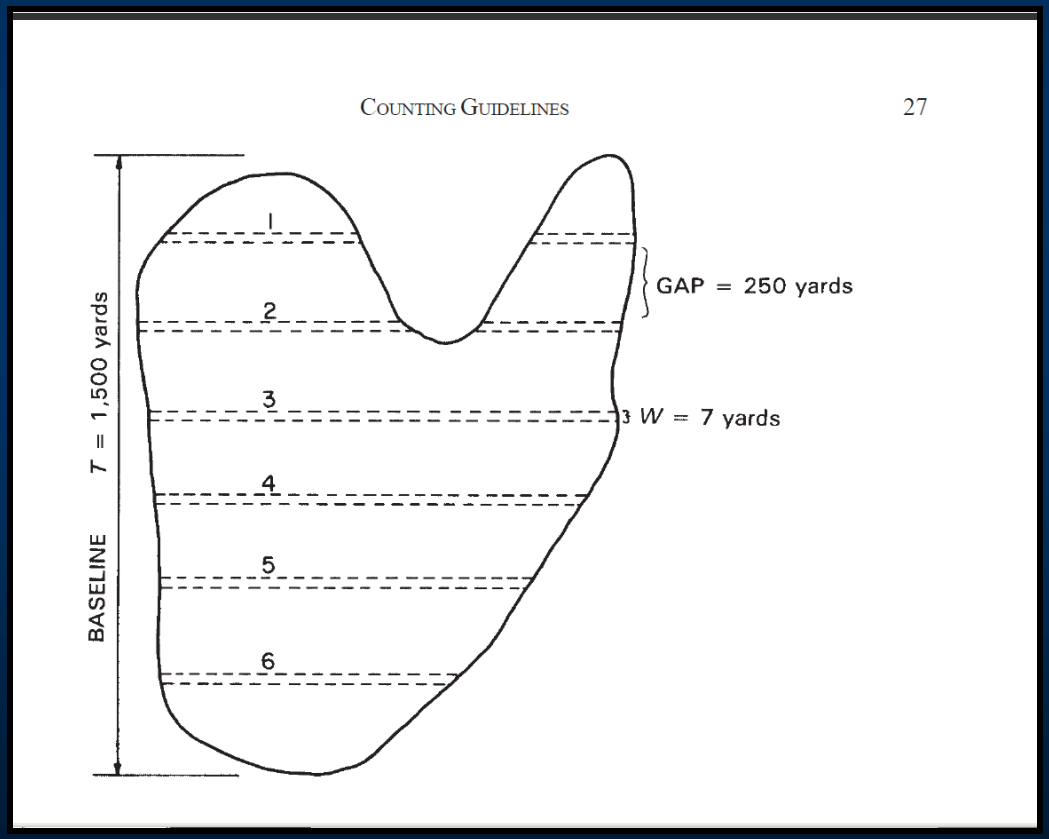
- Determine transect width
- Select sample of transects perpendicular to baseline
- Ensure transects are equidistant apart
- Run at least three transects



Water Body Guidance

Lakes and Wide Streams - Open Water

- Land may interrupt transect
- Count and measure fish along both arms as if continuous



Water Body Guidance

Scenario: Lake Coffield @ Camp Allen

Shoreline Counts – Systematic Sampling with Random Start

Water Body Guidance

Scenario: Lake Coffield @ Camp Allen

Shoreline distance - approximately 2700 m

Ten 270 m Segments available to sample

Water Body Guidance

Scenario: Lake Coffield

Each Segment divided into uniform sample Sites

Water Body Guidance

Scenario: Lake Coffield

A random start selected to avoid biased sampling

Water Body Guidance

Scenario: Lake Coffield

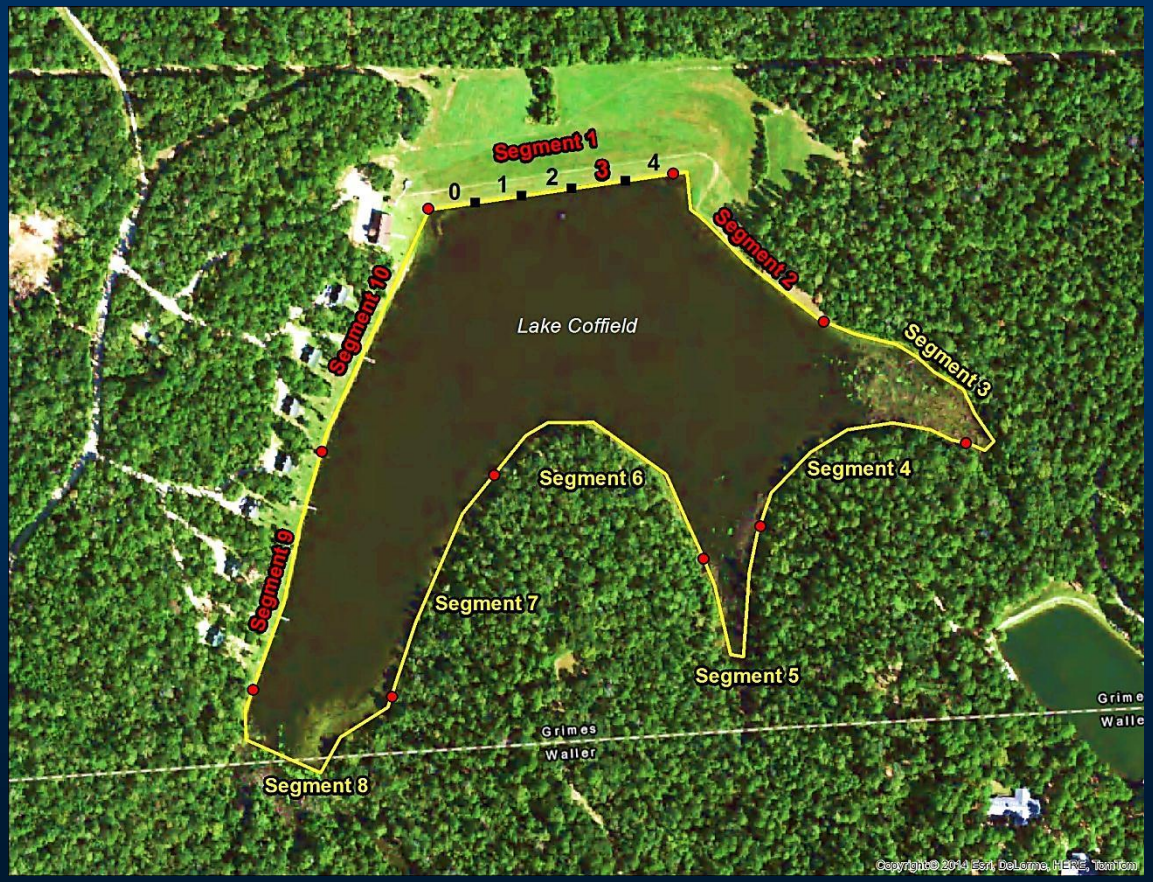
Total Area/Sample Sites = Expansion Factor

Example

- **Total Area = 1080 m**

- **Sample Sites = 216 m**

Expansion Factor = 5.0



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Counting and Measuring Dead Fish

Use Fish Kill Count Sheet to record information during mortality assessment

- Water body, Segment Number
- Date, Time, Site, Investigator(s)
- Site and Sample Type
- Lat/Long, Length of Site and Segment

Texas Parks & Wildlife Department --- Kills and Spills Team
FISH KILL COUNT SHEET

Page Number: ____ of ____

Waterbody: _____ **Segment Number or Name:** _____
Date (mm/dd/yyyy): _____ **Time** (0000-2400 hrs): _____ **Site Number:** _____ **Location:** _____
Investigators (List all): _____
Site Type: (Circle One) Linear / Areal **Sample Type:** (Circle One) Shoreline (1 bank or 2 banks?) / Open Water (Transects) / Drift
Total Length of Site (Mark site on Map): _____ **Width of Site** (Boat and Reach): _____
Beginning Latitude: _____ **Beginning Longitude**: _____ **Transect Bearing**: _____
Ending Latitude: _____ **Ending Longitude:** _____
Total Length of Segment (or stopping point) _____ **Size of Area Affected: Describe area of interest on back or map.**

SEGMENT is Total Area Affected; SITE is Actual Sampled Locations within Segment

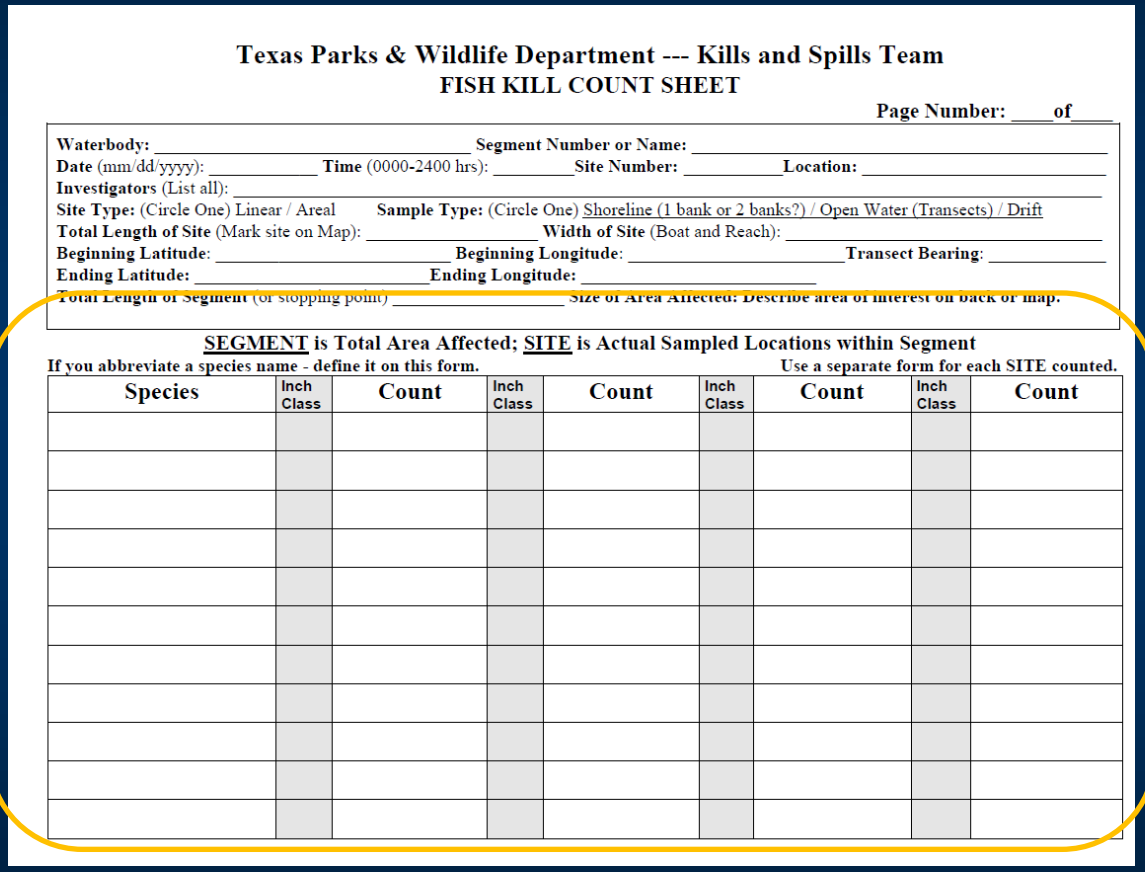
If you abbreviate a species name - define it on this form. Use a separate form for each SITE counted.

Species	Inch Class	Count	Inch Class	Count	Inch Class	Count	Inch Class	Count

Counting and Measuring Dead Fish

Measure and count each species of fish within sampling site of segment or transect

- Measure all fish from each size class for each species present
- Total length measurement (inches)
  - Measure from tip of snout to tip of tail (be sure to pinch tail)



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Counting and Measuring Dead Fish

Counting and Measuring Dead Fish

Caveats of Fish Measurements

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Field Exercise at Lake Coffield

- Breakout into 10 teams
- Select a team captain
- Determine extent of fish kill
- Develop a fish kill (FK) count strategy
- Conduct FK count
- Summarize FK (#/$)

Field Exercise Packet

Handed to team captains at Lake Coffield

1. Team Investigation Summary Form
2. Map
3. Fish Kill Count Sheets
4. Random Number Table

Bring your field gear and drinking water!

Questions?

TEXAS PARKS & WILDLIFE